

## POLYMORPHIC FORM *PALLESCENS* FEMALES OF *HYPOLIMNAS BOLINA* (LINNAEUS) (LEPIDOPTERA: NYMPHALDAE) FROM TONGA

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### Abstract

Thirty polymorphic females of *Hypolimnas bolina* (Linnaeus, 1758) were collected from the Tongan islands of Tongatapu and 'Eua during May 1985 and April 2010. The abnormally large proportion of pale f. *pallescens* specimens, particularly from 'Eua, is discussed and 14 of these are illustrated.

### Introduction

*Hypolimnas bolina pallescens* (Butler, 1874) is the subspecies found on the Pacific Ocean islands of Tokelau, Fiji, Tonga, Samoa (previously Western Samoa) and American Samoa (Tennent 2006). The name *pallescens* was originally used by Butler to describe a female *Hypolimnas bolina* (Linnaeus, 1758) from the Solomon Islands, as *Diadema pallescens* Butler. For the sake of clarity, the present author acknowledges that all specimens collected in Tonga presently belong to the subspecies *H. b. pallescens* but is referring only to the pale form of this subspecies, also called *pallescens*, in this paper.

The form name *pallescens*, along with numerous other names cited by Poulton (1924), Clark and Sheppard (1975), Lachlan (2014) and a number of other authors, have been used to describe some of the many different forms of the extremely polymorphic *H. bolina* females found on many of the Pacific islands and in other parts of its known range.

The present author visited the Kingdom of Tonga in May 1985 and April 2010. While conducting a survey of the butterflies of the island of 'Eua, approximately 18 km southeast of the main island of Tongatapu, during April 2010, it quickly became apparent that there was an unusually high percentage of very pale *H. b. pallescens* f. *pallescens* females to be found. The author had never seen such numbers of this unique female form on any Pacific island up to that time or more recently (Lachlan 2014).

Not a lot has been written about *H. bolina* from Tonga over the years. Four forms of *H. bolina* were listed as occurring there, including the pale forms, by Clark and Sheppard (1975) in their Localities Table under the name Friendly Islands, an old name for Tonga. Miller and Miller (1993) described *H. b. pallescens* as a common species and noted that 'Tongan females are highly variable' and 'display a bewildering range of forms'.

### Surveys

In May 1985 the author collected several species of butterflies on the main island of Tongatapu, including three *H. b. pallescens* females. In 2010 an intensive survey of the nearby island of 'Eua was conducted from 10 to 18

April. It was primarily hot and sunny each day and a variety of butterfly species were encountered daily. Several *H. b. pallescens* females were seen and collected on each day of the survey along the forest roads and trails. As noted by Lachlan (2014), many of the very pale female *pallescens* appeared to fly quite rapidly and did not seem to alight as often as the other, darker forms. Therefore many additional specimens of this form, in particular, evaded capture.

***Hypolimnas bolina pallescens* (Butler, 1874)**

(Figs 1-14)

*Material examined.* First survey: 9 ♂♂, 3 ♀♀, TONGA : 3 km east of Nuku'alofa, Tongatapu Is. 15-16.v.1985, R.B. Lachlan. (All in RBL collection).

Second survey: 13 ♂♂, 27 ♀♀, TONGA : 'Eua Island, 21°23'35.3"S, 174°56'42.5"W and 21°25'43"S, 174°56'45"W, 10-18.iv.2010, R.B. Lachlan. (All in RBL collection).

The different female forms collected during both surveys and their numbers are recorded in Table 1.

*Specimen sizes.* All measurements are set wingspans. The largest recorded was 75 mm (Fig. 3); the smallest recorded was 57 mm (Fig. 14). The average was 67.6 mm, (n = 30). The smallest specimen recorded is abnormally small for this species. The next smallest specimen was 62 mm. Thirteen specimens ranged between 66-68 mm. Eight specimens ranged between 70-75 mm.

**Table 1.** Combined results for *Hypolimnas bolina pallescens* females from both surveys.

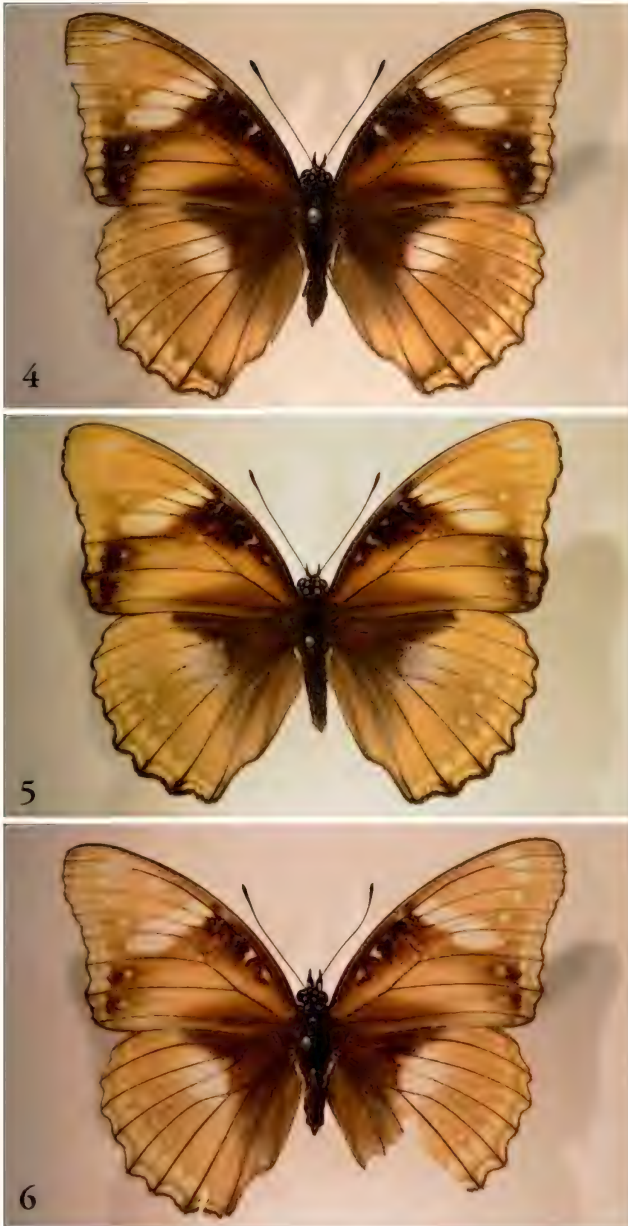
Form	Numbers collected / %
<i>euploeoides</i>	0 / 0
<i>euploeoides-naresi</i>	0 / 0
<i>naresi</i>	9 / 30
<i>euploeoides-nerina</i>	3 / 10
<i>nerina</i>	2 / 6.6
<i>euploeoides-pallescens</i>	1 / 3.3
<i>pallescens</i>	15 / 50

### Discussion

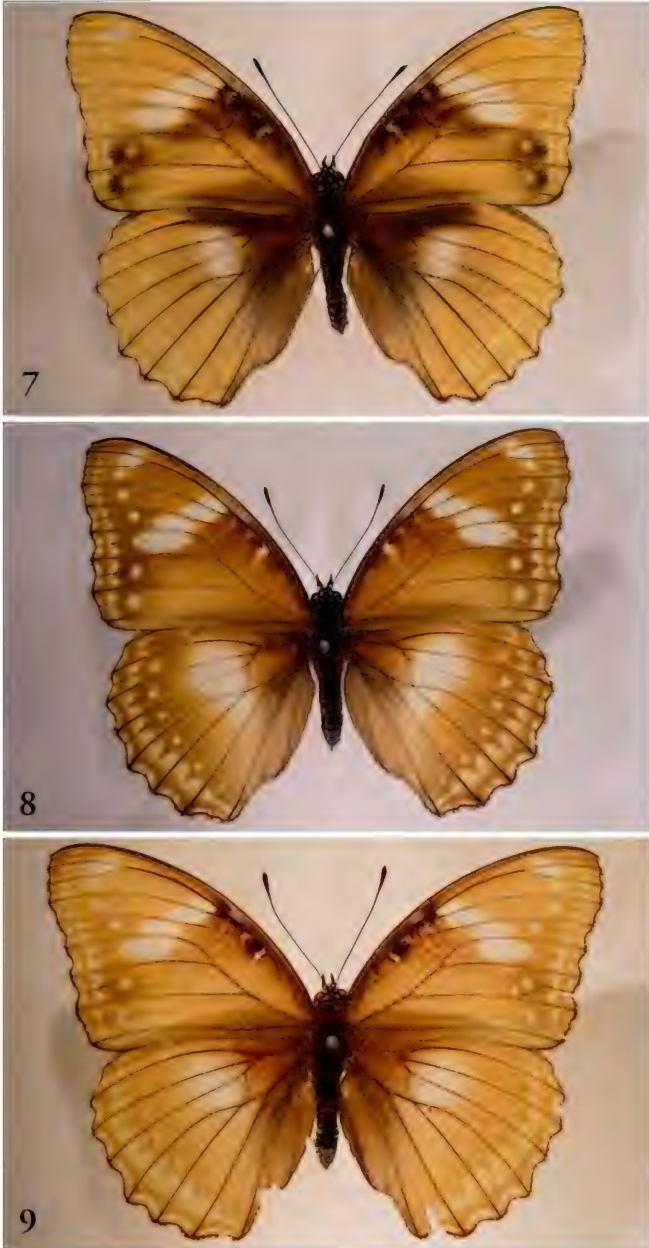
Clark and Sheppard (1975) used the varietal names for the four main forms given by Poulton (1924) to group the four basic phenotypes of this extremely polymorphic species. They are: form *euploeoides*, a very dark, relatively plain form; form *naresi*, often male-like in appearance; form *nerina*, having a bright orange-brown variable patch two-thirds of the way along the inner border of the forewing; and form *pallescens*, with the base of the fore and hindwings tending to be dark brown (variable), the rest of the wing areas replaced with orange-brown (can be very pale and variable) and with white patches (variable in size) visible on the fore and/or hindwings.



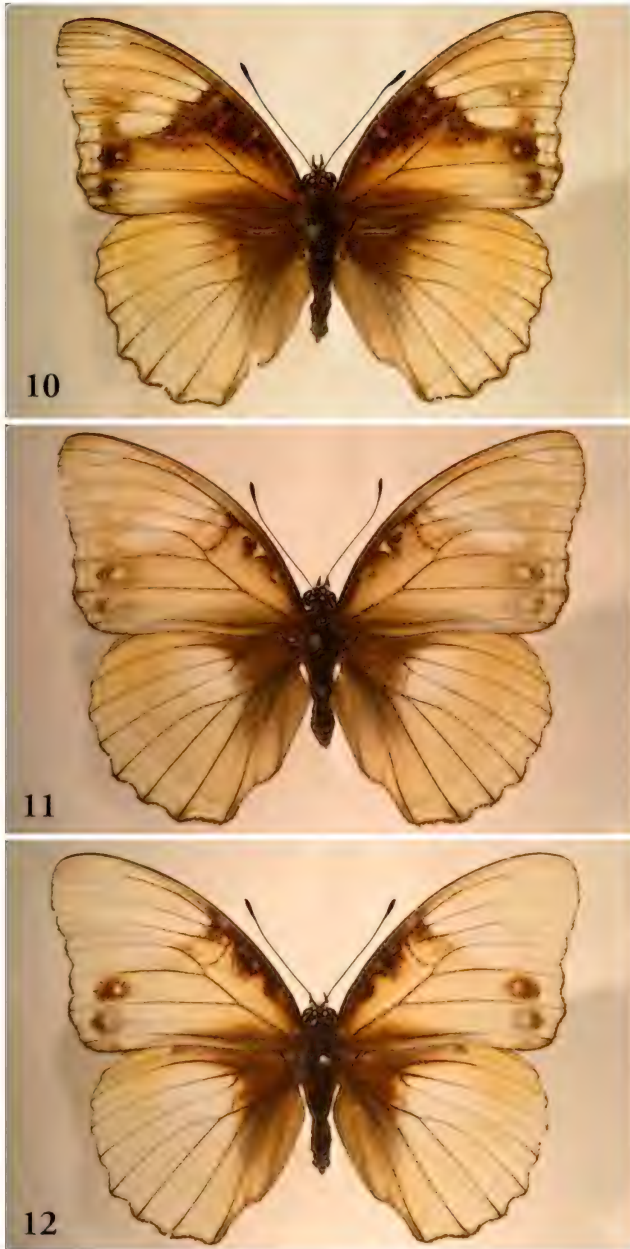
**Figs 1-3.** Females of *Hypolimnas bolina* from Tonga: (1) f. *euploeoides-pallescens*; (2-3) f. *pallescens*.



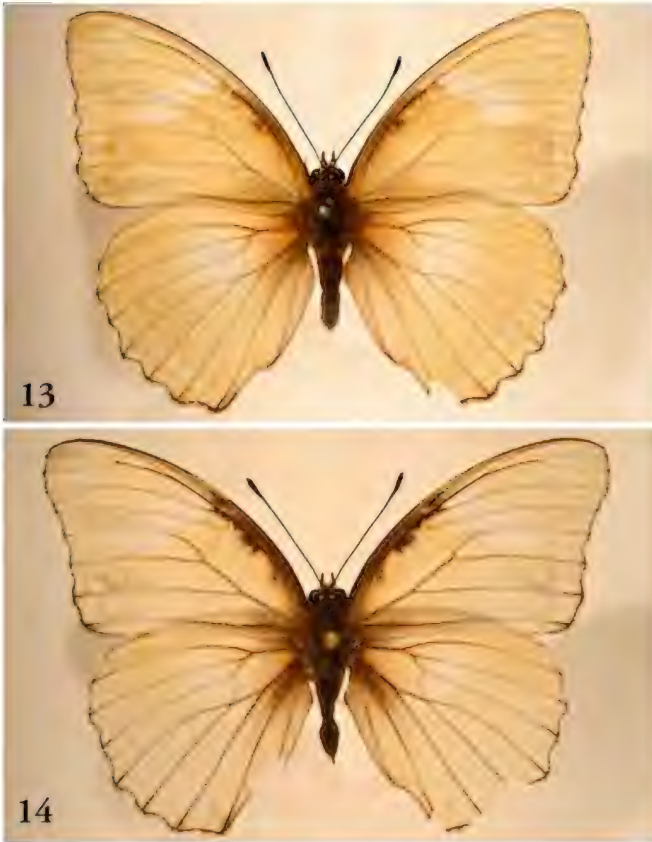
**Figs 4-6.** Females of *Hypolimnias bolina* from Tonga: *f. pallescens*.



**Figs 7-9.** Females of *Hypolimnas bolina* from Tonga: f. *pallescens*.



**Figs 10-12.** Females of *Hypolimnias bolina* from Tonga: *f. pallelescens*.



**Figs 13-14.** Females of *Hypolimnias bolina* from Tonga: f. *pallescens*.

Clark and Sheppard (1975) also added three intermediate forms: *euploeoides-naresi*, *euploeoides-nerina* and *euploeoides-pallescens* but, for reasons unknown, they left out the intermediate form *euploeoides-naresi* from their very comprehensive Table 1 ‘Localities of the various forms of *H. bolina*’. In that Table they recorded the forms *naresi*, *nerina*, *euploeoides-pallescens* and *pallescens* from Friendly Is (Tonga).

The present author recorded three morphs of the form *euploeoides-nerina* (not recorded by Clark and Sheppard 1975) and, surprisingly, fifteen morphs of the form *pallescens*. This high percentage of form *pallescens* is significant and very unusual given that this form is not encountered very often, even in other Pacific countries where it has been recorded such as New Caledonia, Vanuatu, Fiji, Samoa, Tokelau and the Cook Islands. It is rarely encountered anywhere else. Tennent (2009) indicated an increasing number of female

forms in the southern islands of Vanuatu but the 25 *H. bolina* females he illustrated in colour did not show any individuals as pale as those collected in Tonga. Tennent (2006) was more specific when he stated that ‘there is a considerable increase of [form] *pallescens*’ in the southern Vanuatu islands of Tanna, Futuna and Aneityum.

It is interesting to note that Miller and Miller (1993) examined a collection of 26 female *H. b. pallescens* taken by D. Thomas in August-September 1986, mostly from Vava’u, north of Tongatapu, and described seventeen of the specimens as ‘similar to, or even paler than, the one figured by d’Abrera (1977: 222) as typical of *pallescens*.’ This represented 65% of the entire collection. The present author’s recent survey also supports the fact that higher numbers of form *pallescens*, including very pale morphs, seem to be commonly encountered in Tonga, perhaps more than anywhere else in the Pacific region.

### Acknowledgements

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